

# Notes on Fossil Chitons. 3. A new species of *Leptochiton* (Mollusca: Polyplacophora) from the Pleistocene of South Italy

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## Abstract

*Leptochiton serenae* n. sp. is described from Early Pleistocene clayey deposits at Cutrofiano and Isola del Campo, near Lecce, Southern Italy. The new species has a distinctive sculpture on the tegmentum. It was compared with the five species of *Leptochiton* known from the Pleistocene of Southern Italy, and with two living North Atlantic species, *Leptochiton asellus* (Gmelin, 1791) and *Leptochiton arcticus* (G.O. Sars, 1878), sharing some similarities with *Leptochiton serenae* n. sp.

## Riassunto

Viene segnalata una nuova specie di *Leptochiton* proveniente dai depositi argillosi del Pleistocene Inferiore di due località in provincia di Lecce (Italia meridionale): Cava Lustrelle (Cutrofiano) e Isola del Campo (Gallipoli). *Leptochiton serenae* n. sp. è caratterizzata dalla scultura del tegmentum formata da granuli che si sviluppano obliquamente, arrangiati in strie longitudinali nelle aree centrali e antemucronale, in strie radiali nelle aree laterali e postmucronale, con apofisi piuttosto larghe per il genere. La nuova specie è confrontata con le cinque specie note per il Pleistocene dell'Italia meridionale e con due specie nord-atlantiche viventi, *Leptochiton asellus* (Gmelin, 1791) e *Leptochiton arcticus* (G.O. Sars, 1878) che presentano alcune affinità con la stessa. *L. serenae* n. sp. presenta comunque caratteristiche diverse dalle altre specie di *Leptochiton* sia mediterranee che atlantiche. Questa segnalazione riveste una certa rilevanza in considerazione della rarità dei ritrovamenti di poliplacefori nei sedimenti del Pleistocene inferiore del Sud Italia.

## Key words

Mollusca, Polyplacophora, *Leptochiton*, new species, Pleistocene, Southern Italy.

## Introduction

During the examination of Lower Pleistocene clay sediments of two fossiliferous sites from Salento (Apulia, South Italy), a few valves, belonging to the same polyplacophoran species, were found. The conchological characters are indicative of *Leptochiton*, a genus characterized by valves lacking insertion plates, sutural laminae (apophyses) small and neatly separate, tegmentum uniformly granulated, and girdle narrow, covered with scales or with scales and spicules (Kaas & Van Belle, 1985; Dell'Angelo & Smriglio, 1999). The granules, raising vertically from the tegmentum, are generally of small size, with rather regularly arranged aesthetes, and disposed in radial or longitudinal rows, quincuncially or randomly. Almost all characters of the collected valves are indicative of the genus, the introduced species is quite distinct from any other known living and fossil Mediterranean and Atlantic *Leptochiton* species.

## Materials

Two valves come from Cutrofiano (Lecce, South Italy); they were obtained from the washing of 236 clay samples collected from Cava Lustrelle, an exhausted clay quarry that now is a protected fossiliferous area (Piccioli Resta & Prete, 2003).

The sedimentary beds of Cutrofiano belong to the marine sedimentary cycle of the "Bradana Foredeep" (De Franchis, 1894). This cycle is divided into four units, chronostratigraphically referred to Medium Pliocene to Lower Pleistocene and that are, in sequence: *Calcarenite of Gravina*, *Subappenninic clays*, *Sands of Monte Marano*, *Conglomerate of Irsina* (Bossio *et al.*, 1987). The unit, in which the present species lies, is composed by grey-bluish marl-silt clays dated Santernian-Aemilian limit (Lower Pleistocene) (Ruggieri *et al.*, 1984).

Four valves were collected from a screening of 108 bottom samples obtained by scuba at Isola del Campo (Gallipoli, South Italy) on a sandy-clay silt in 5 meter depth. This second site is chronostratigraphically connected to Cutrofiano, dated Lower Pleistocene but palaeontological evidences move the deposition of the layers to the Emilian-Sicilian limit, comprised in the series known as "Gallipoli Formation" (Coppa & Crovato, 1982).

## Abbreviations

BDA: B. Dell'Angelo Collection, Prato (Italy) (it will become the property of the MZB);  
GPR: G. Piccioli Resta Collection, Santa Maria al Bagno, Lecce (Italy);  
MZB: Zoological Museum of Bologna University (Italy).

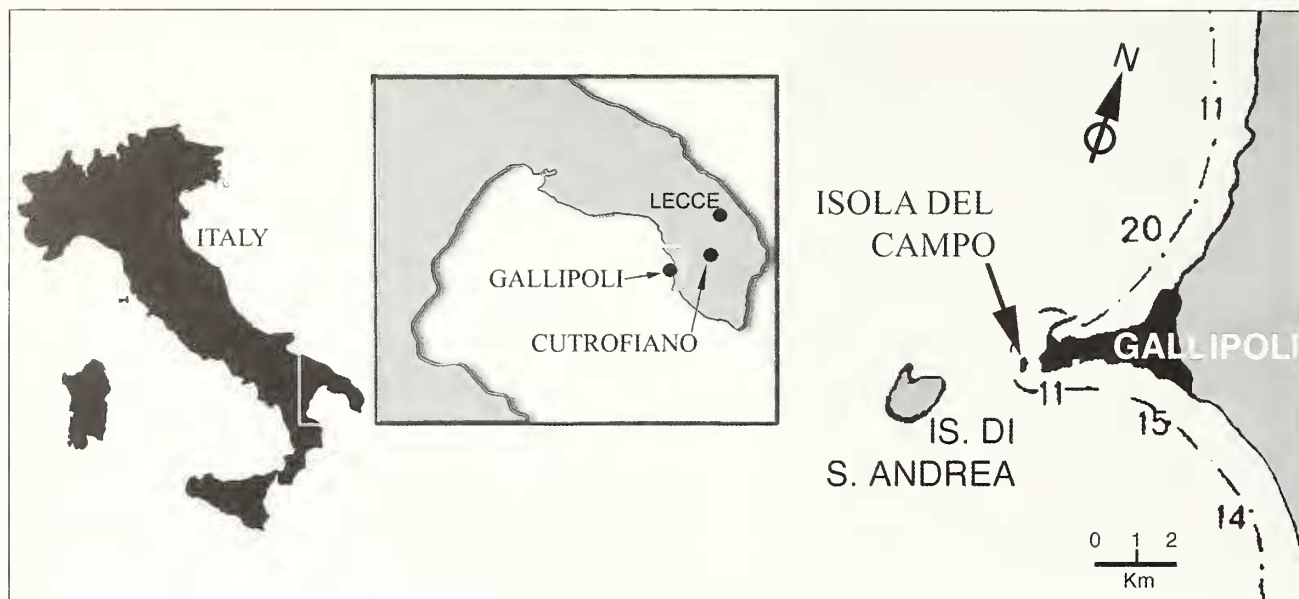


Fig. 1. Location map.

Fig. 1. Mappa delle località.

## Systematics

We follow the systematics proposed by Sirenko (2006).

Classis POLYPLACOPHORA Gray, 1821  
 Subclassis LORICATA Shumacher, 1817  
 Ordo LEPIDOPLEURIDA Thiele, 1909  
 Familia LEPTOCHITONIDAE Dall, 1889  
 Genus *Leptochiton* Gray, 1847

Type species: *Chiton cinereus* sensu Montagu, 1803 (*non* Linnaeus, 1767) = *Leptochiton asellus* (Gmelin, 1791), by subsequent designation (Gray, 1847)

*Leptochiton serенаe* n. sp.

Fig. 2

## Diagnosis

Valves solid. Tegmentum with granules that develop obliquely from the surface, arranged in longitudinal rows on central and antemucronal areas and radially on lateral and postmucronal areas. Apophyses wide.

## Description

Head valve not available. Intermediate valves broadly rectangular, subcarinate, moderately elevated (estimated height/width 0.42), front and hind margins quite straight, side margins slightly rounded, jugal sinus crenulated, apices inconspicuous, lateral areas hardly or not raised, but clearly recognizable by different sculpture. Tail valve semi-elliptical, anterior margin almost straight, anteriorly prominent backward directed mucro, postmucronal slope slightly concave.

Granules arranged in 60 longitudinal rows on central area of intermediate valves, in 7-8 radial rows on lateral areas of intermediate valves, in 36-60 rows on antemucronal area and in 36-50 rows on postmucronal area, in-

terrupted by commarginal growth lines, thin near edges of lateral areas and stronger on postmucronal area. Granules, separated from each other, develop obliquely from tegmentum, so that aesthetes are oblique or, in some cases, almost vertical (Fig. 2 f). There are 3-5 aesthetes of equal width, not differentiated in macro- and micro-aesthetes, and not placed in a peculiar order. Radial postmucronal rows of granules show them flat near mucro, and gradually more obliquely elevated proceeding towards valve margin (Fig. 2 e). The surface of the granules appears to be rough (Fig. 2 f).

Articulamentum without insertion laminae. On the ventral side of intermediate valves the posterior area presents an expanded central zone, with a straight anterior margin. Apophyses wide, triangular in intermediate valves, trapezoidal in tail valve.

## Material

Cutrofiano: 2 valves (1 intermediate and 1 tail); Gallipoli, Isola del Campo: 4 valves (2 intermediate and 2 tail).

## Type material

Holotype: MZB 23749 (1 tail valve, Gallipoli, Isola del Campo, figs 2 a-f). Paratypes: MZB 23750 (1 intermediate valve, Cutrofiano); BDA 4735 (1 intermediate, figs 2 g-j, and 1 tail valve, Gallipoli, Isola del Campo); GPR (1 intermediate valve, Gallipoli, Isola del Campo, and 1 tail valve, Cutrofiano, figs 2 k-l).

## Type locality

Southern Italy, Gallipoli, Isola del Campo (Lecce prov.).

## Type stage

Santernian-Aemilian limit (Lower Pleistocene).

## Etymology

The specific name, *serenae*, is a tribute to Serena Lezzi, Giuseppe Piccioli's wife.

## Remarks

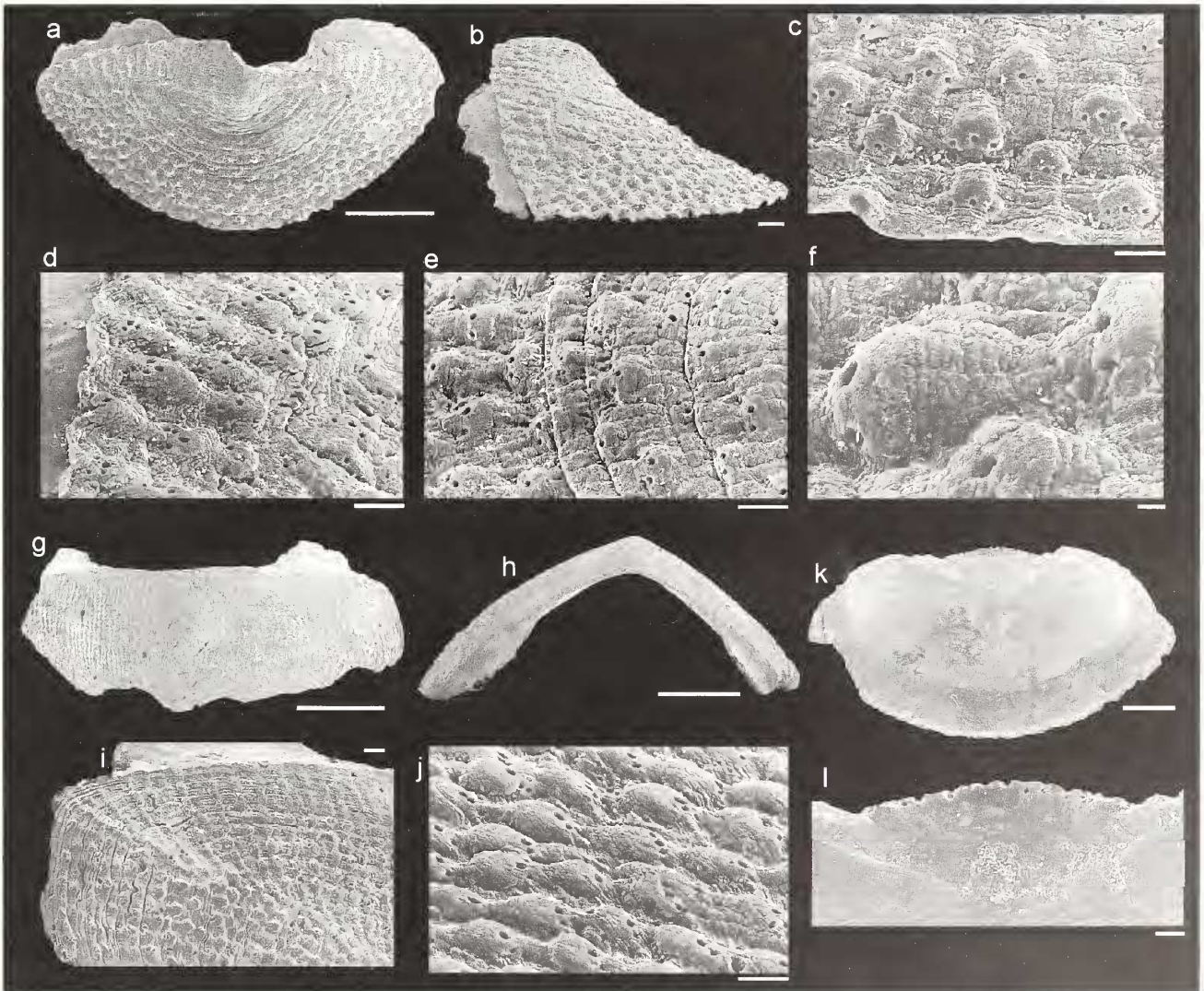
In spite of the large amounts of bulk sediment examined during several years, only three other polyplacophoran species were found at Cutrofiano: *Callochiton septemvalvis* (Montagu, 1803) (2 intermediate valves), *Chiton corallinus* (Risso, 1826) (1 head valve), and *Acanthochitona fascicularis* (Linnaeus, 1767) (2 intermediate valves). Thus chiton valves are very rare in the examined sediments.

The valves of the new species found at Cutrofiano and Gallipoli are in good conditions of preservation. None of the three intermediate valves is complete, so it has been

possible only to estimate in one valve the height/width ratio. The three tail valves are of different size [width 2.3 (holotype), 3.5, and 4.5 mm respectively], and show variability in some characters, for example the number of longitudinal antemucronal rows of granules, which are respectively 36, 44, and 60.

Only 5 species of *Leptochiton* are known from the Pleistocene of Southern Italy:

- *Leptochiton algiresirensis* (Capellini, 1859) from Ficarazzi (Palermo prov., Sicily), Musalà and Pezzo (Reggio Calabria prov., Calabria) (Dell'Angelo & Palazzi, 1989; Bellomo & Sabelli, 1995);
- *Leptochiton cimicoides* (Monterosato, 1879) from Gallipoli (Lecce prov., Puglia) and Pecoraro (Reggio Calabria prov., Calabria) (Dell'Angelo & Palazzi, 1989);
- *Leptochiton sarsi* Kaas, 1981 from Archi and San Procopio (Reggio Calabria prov., Calabria), Salice and Venetico Marina (Messina prov., Sicily) (Dell'Angelo



**Fig. 2.** *Leptochiton serenae* n. sp.: **a-f.** Holotype (MZB 23749), tail valve: **a.** dorsal view, scale bar = 500 µm, **b.** lateral view, scale bar = 100 µm, **c.** granules of postmucronal area, scale bar = 50 µm, **d.** granules of antemucronal area near the apophyses, scale bar = 50 µm, **e.** granules of postmucronal area near the mucrone, scale bar = 50 µm, **f.** granules, scale bar = 10 µm, **g-j.** paratype (BDA 4735), intermediate valve: **g.** dorsal view, scale bar = 1 mm, **h.** frontal view, scale bar = 1 mm, **i.** detail of sculpture, scale bar = 100 µm, **j.** granules, scale bar = 50 µm; **k-l.** paratype (GPR), tail valve: **k.** ventral view, scale bar = 500 µm, **l.** jugal sinus crenulated, scale bar = 100 µm.

**Fig. 2.** *Leptochiton serenae* n. sp.: **a-f.** Olotipo (MZB 23749), piastra posteriore: **a.** vista dorsale, scala = 500 µm, **b.** vista laterale, scala = 100 µm, **c.** granuli dell'area postmucronale, scala = 50 µm, **d.** granuli dell'area antemucronale vicino alle apofisi, scala = 50 µm, **e.** granuli dell'area postmucronale vicino al mucrone, scala = 50 µm, **f.** granuli, scala = 10 µm, **g-j.** paratipo (BDA 4735), piastra intermedia: **g.** vista dorsale, scala = 1 mm, **h.** vista frontale, scala = 1 mm, **i.** dettaglio della scultura, scala = 100 µm, **j.** granuli, scala = 50 µm; **k-l.** paratipo (GPR), piastra posteriore: **k.** vista ventrale, scala = 500 µm, **l.** seno jugale crenulato, scala = 100 µm.

& Palazzi, 1989; Palazzi & Villari, 1994; Dell'Angelo & Bonfitto, 2005);

- *Leptochiton abacinus* (Dell'Angelo & Palazzi, 1989) from Pezzo (Reggio Calabria prov., Calabria) (Dell'Angelo & Palazzi, 1989);
- *Leptochiton salicensis* (Dell'Angelo & Bonfitto, 2005) from Salice (Messina prov., Sicily) (Dell'Angelo & Bonfitto, 2005).

The report of *Leptochiton asellus* (Gmelin, 1791) from the Pleistocene of Pezzo (Bellomo & Sabelli, 1995) remains doubtful.

Our species is characterized by its sculpture of granules developing obliquely from the tegmentum, which differs from that of other known living and fossil Mediterranean and Atlantic *Leptochiton* species.

The new species shows some similarities only with two North Atlantic species, *Leptochiton asellus* (Gmelin, 1791) and *Leptochiton arcticus* (G.O. Sars, 1878), that have a similar tegmentum sculpture and wide apophyses. These two Atlantic species can be clearly distinguished due to a series of characters. *Leptochiton asellus* has united granules (well separated in *serenae*) and a different number of longitudinal rows of granules on central areas of intermediate valves (70-80 vs. 60 in *serenae*) and radial rows on lateral areas (15-20 vs. 7-8 in *serenae*), a bluntly triangular tail valve with a different lateral view. *L. arcticus* differs mainly in the granulation, which is definitely radial in the lateral areas and end valves of *serenae*, quincuncial in *arcticus*.

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## References

- BELLOMO E. & SABELLI B., 1995. A new addition to the Mediterranean Pleistocene "Boreal Guests": *Hanleya nagelfar* (Lóvén, 1864) (Mollusca, Polyplacophora) from Calabria (S. Italy). *Bollettino della Società Paleontologica Italiana*, **34**: 201-204.
- BOSSIO A., GUELFI F., MAZZEI R., MONTEFORTI B., SALVATORINI G. & VAROLA A., 1987. Studi sul Neogene e Quaternario della Penisola Salentina. VI. - Precisazioni sull'età dei sedimenti pleistocenici di due cave del Leccese (San Pietro in Lama e Cutrofiano). In "Atti del Convegno sulle Conoscenze Geologiche del Territorio Salentino". *Quaderni di Ricerche del Centro Studi Geotecnica e d'Ingegneria*, **11**: 147-174.
- COPPA M.G. & CROVATO P., 1982. Osservazioni biostratigrafiche e paleoecologiche sui depositi argillosi emiliani di Gallipoli (Puglia). *Bollettino della Società dei Naturalisti in Napoli*, **92**: 159-225.
- DELL'ANGELO B. & BONFITTO A., 2005. Notes on Fossil Chitons. 1. A new species of *Lepidopleurus* (Mollusca: Polyplacophora) from the Pleistocene of Salice (Sicily, Italy). *Zootaxa*, **821**: 1-6.
- DELL'ANGELO B. & PALAZZI S., 1989. Considerazioni sulla famiglia Leptochitonidae Dall, 1889 (Mollusca: Polyplacophora). III. Le specie terziarie e quaternarie europee, con note sistematiche e filogenetiche. *Atti I Giornata di Studi Malacologici CISMA*: 19-140.
- DELL'ANGELO B. & SMRIGLIO C., 1999. *Chitoni viventi del Mediterraneo*. Edizioni Evolver, Roma: 256 pp. (English edition 2001, *Living Chitons from the Mediterranean Sea*).
- DE FRANCHIS F., 1894. Descrizione comparativa dei Molluschi postpliocenici del bacino di Galatina. *Bollettino della Società Malacologica Italiana*, **19**: 1-104.
- GRAY J.E., 1847. A list of the genera of Recent Mollusca, their synonymy and types. *Proceedings of the Zoological Society of London*: 129-206.
- KAAS P. & VAN BELLE R.A., 1985. *Monograph of Living Chitons (Mollusca: Polyplacophora)*. Vol. 1. Order Neoloricata: *Lepidopleurina*. E.J. Brill / W. Backhuys, Leiden-London-Köln-Kopenhagen: 240 pp.
- PALAZZI S. & VILLARI A., 1994. Macrofauna batiali plio-pleistoceniche del Messinese. 1: Venetico Marina. *Naturalista Siciliano*, **18** (4): 73-106.
- PICCOLI RESTA G. & PRETE B., 2003. Segnalazione di un giacimento di molluschi marini pleistocenici nel comune di Nardò (Lecce, Italy). *La Conchiglia*, **308**: 47-54, 61.
- RUGGIERI G., RIO D. & SPROVIERI R., 1984. Remarks on the chronostratigraphic classification of lower Pleistocene. *Bollettino della Società Geologica Italiana*, **103**: 251-259.
- SIRENKO B., 2006. New Outlook on the System of Chitons (Mollusca: Polyplacophora). *Venus*, **65**: 27-49.